Figure 1 – Hardware Architecture

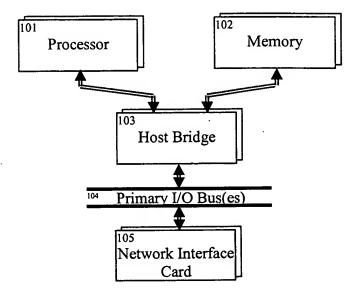


Figure 2 – NIC Hardware Architecture

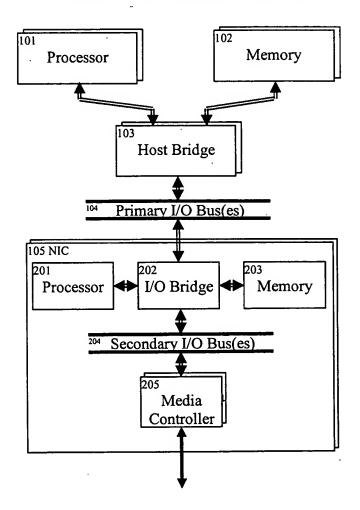


Figure 3 – Vito NIC Hardware Architecture

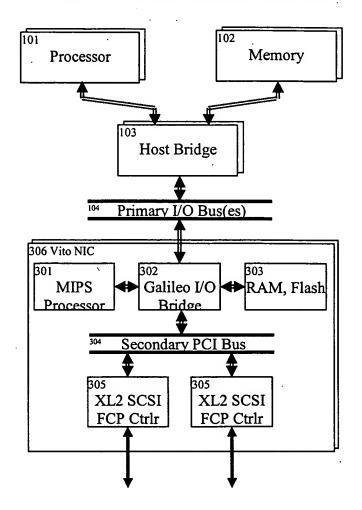


Figure 4 – Vito Software Architecture

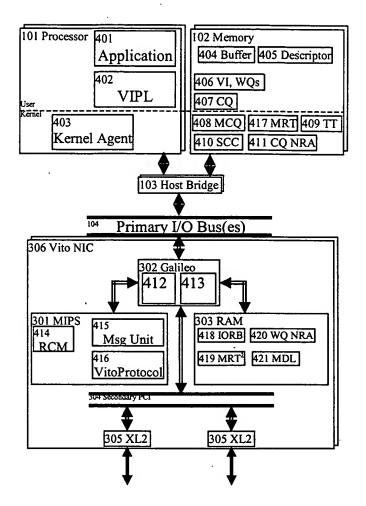


Figure 5 - Memory Registration Message Flows

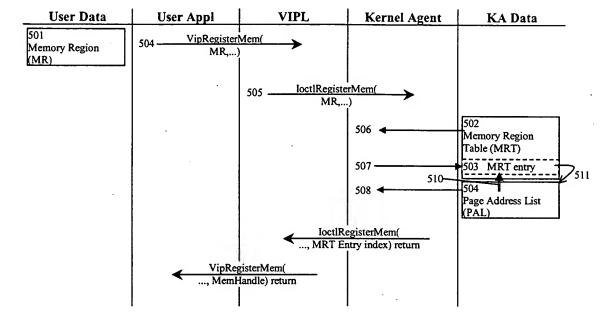


Figure 6 - Descriptor Posting Message Flows

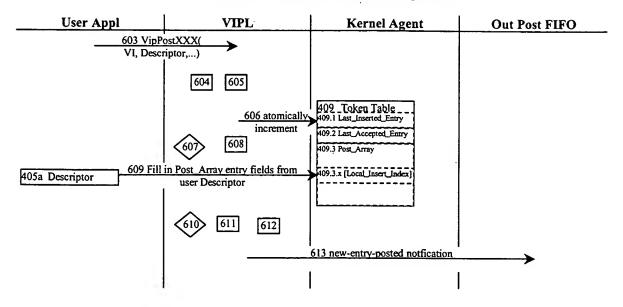


Figure 7 - Msg Unit Descriptor Processing Message Flows

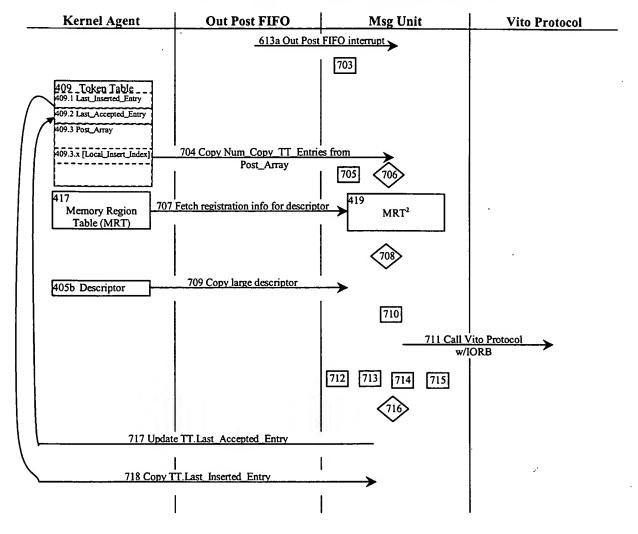


Figure 8 - Send Processing Message Flows

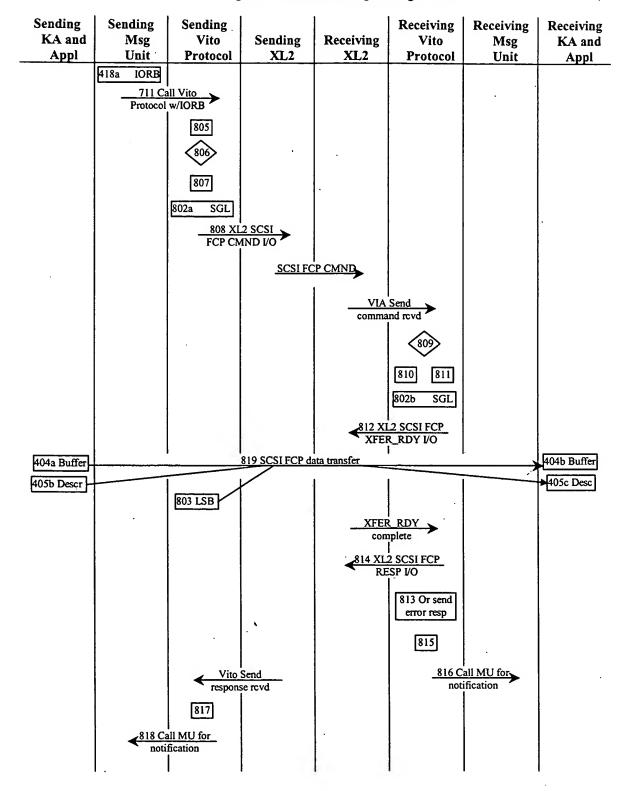


Figure 9 - RDMA-Write Processing Message Flows

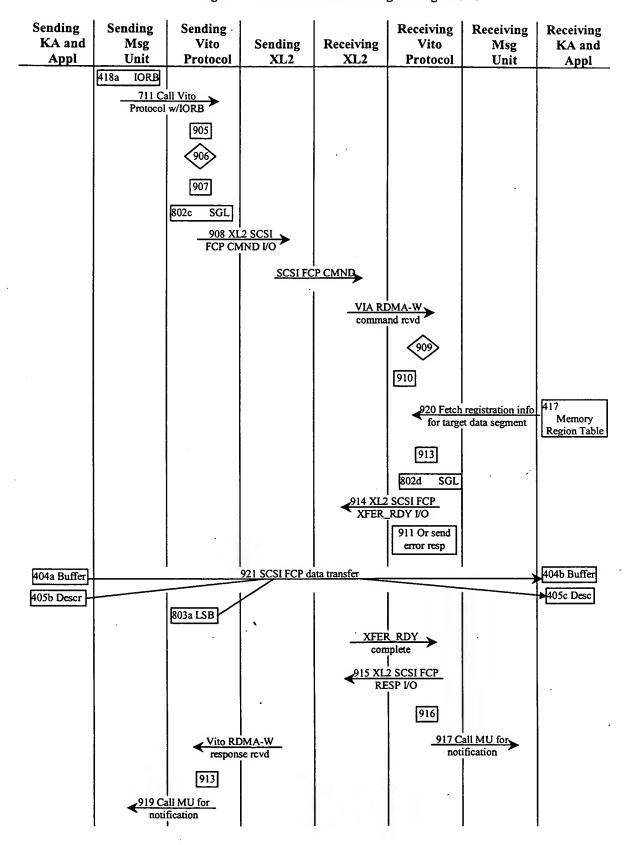


Figure 10 - RDMA-Read Processing Message Flows

Sending KA and Appl	Sending Msg Unit	Initiating Vito Protocol	Sending XL2	Receiving XL2	Responding Vito Protocol	Receiving Msg Unit	Receiving KA and Appl
	418a IORB 711 C	all Vito					
	Protocol	1002					
		1003					
		802e SGL					
		FCP CN	IL2 SCSI AND I/O				
			<u>SCSI FC</u>	CP CMND			
				VIA R comma	DMA-R and revd		
					1000		
					1007 1008		417
					<b>▼</b> 1010 Fe info fo	tch registration or source data	Memory Region Table
					1011 802f SGL		
	."1			< 1012 7 FCP F	802f SGL CL2 SCSI RESP I/O		
404a Buffer	(		1013 SCSI FO	CP data transfer		7.	404b Buffer
		✓ Vito RI	OMA-R se rcvd				
		1014					
	1015 C	fication	0.7				
		1016					

Figure 11 - Work Queue Completion Notification Message Flows

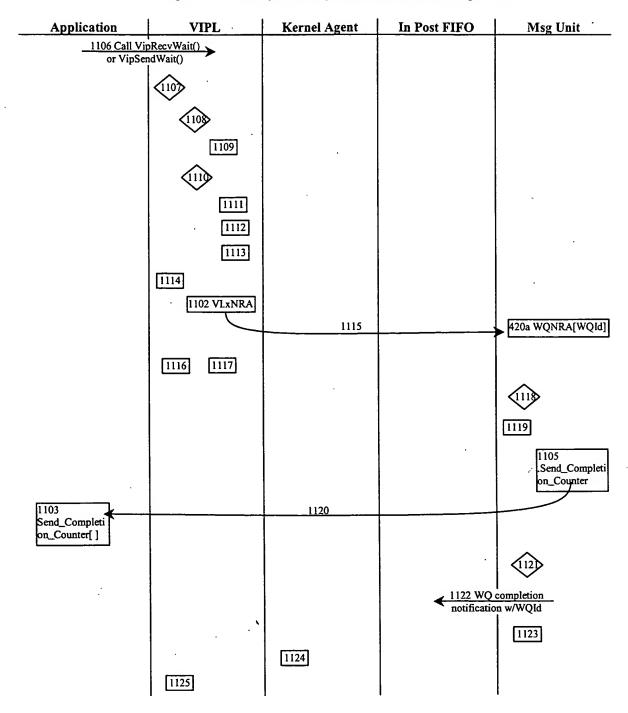
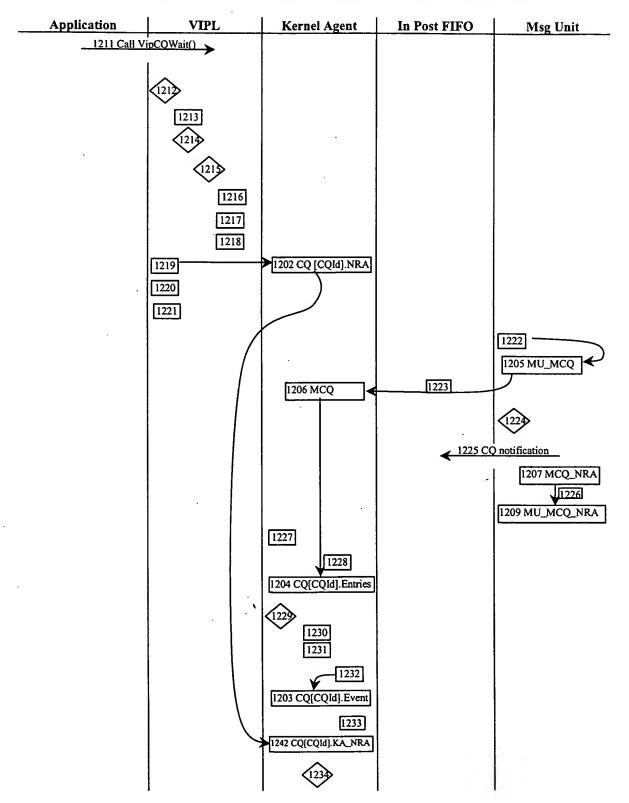


Fig. 12.1

Figure 12 - Completion Queue Completion Notification Message Flows



Application	VIPL	Kernel Agent	In Post FIFO	Msg Unit
		1208 KA_MCA_NRA		
		1236		
		1237		
	1238			
	1239			
	1240			
	1241			

Fig. 12.2

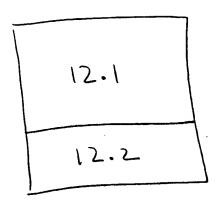


Figure 13 - Memory Deregistration Message Flows

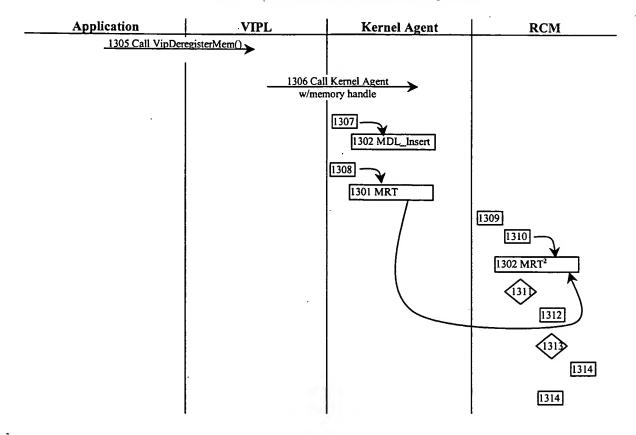


Figure 14 – Vito-FC FCP\_CMD IU Updates

SCSI Fibre Channel Protocol FCP_CMD Information Unit						Vito	over SCSI Fibre C	hannel Proto	col FCP_CMD In	formation Unit			
	Word	Byte 0	Byte 1	Byte 2 Byte 3		Word	Byte 0	Byte 0 Byte 1		Byte 3			
500	٥	First Lovel LUN		LUN Second Level LUN			Second Level LUN		o	VI Number		Remote \	/I Number
FCP_LUN	1	Third Le	evel LUN	Fourth L	avel LUN	1		Re	served	red			
FCP_CNTL	2	Cmd Ref Num	Task Codes	Task Mgmt Flags	Exec Mgmt Codes	2	VI Control Seg	ment Flags	VI Operation Type	FCP R/W bits			
	3	1st Byte of COB		•		3							
	4					4							
FCP_CDB	5				·	5	Uppe	Upper RDMA Remote Memory Virtual Address					
	6				16th Byte of CDB	6	Low	er RDMA Remote	Memory Virtual Addre	ess .			
FCP_DL	7		Data	Length		7		Oata	Length				
Additional FCP_CDB	8-n		Additiona	FCP_CDB		8-n		Uı	nused				

fi

Figure 15 – Vito-FC FCP\_RESP IU Updates

			Fibre Channel F Informati	Protocol FCP_RE on Unit	ESP		Vito ove		hannel Protocol nation Unit	FCP_RESP
	Word	Byte 0	Syte 1	Byte 2	Byte 3	Word	Byte 0	Byte 1	Byte 2	Byte 3
reserved	0					o				
	1					. 1				
FCP_STATUS	2	reserved	reserved	Validity Flags	SCSI Status Byte	2	reserved	reserved	Validity Flags	SCSI Status Byte
FCP_RESID	3					3				
FCP_SNS_LE	N 4		(length of FCP_S	SNS_INFO in bytes		4	(0=Good FCP_RESP and 8=8ad FCP_RESP)			
FCP_RSP_LE	N 5		(0.4, or 8 by	ites per FCP)	~	5	(O=	Good FCP_RESP	and 8=Bad FCP_RE	SP)
FCP_RSP_INF	6	reserved	reserved	reserved	RSP_CODE	6	reserved	reserved	reserved	RSP_CODE
	7	reserved	reserved	reserved	reserved	7	reserved	reserved	reserved	reserved
FCP_SNS_INF	O <sub>8-n</sub>	(Var	iable length as define	ed by the FCP_SNS_	LEN)	<b>8</b> −n		VI Stat	us Code	

Fig. 16

IN	FOST	-4128
OUT	Post.	4136   302a

Ĺi.

Figure 17

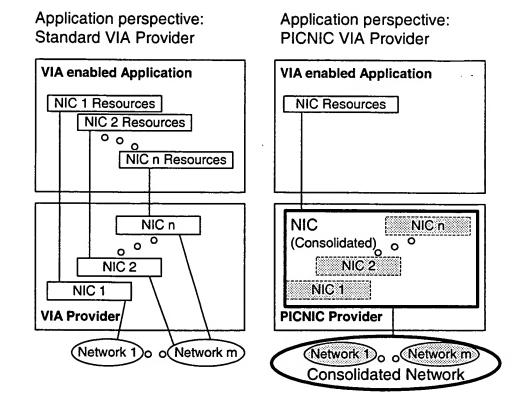
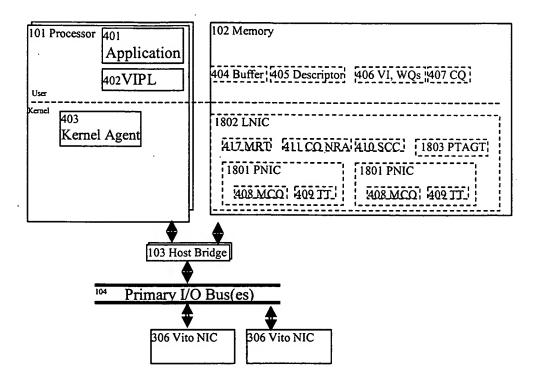


Figure 18 – PICNIC Data Structures



Host z01a NIC z02a NIC z02b NIC z02c Port Port z03c z03d Port z03e Port Port Port z03a z03b z03c Port z03f Port z03i NIC z01c Host Host Port z01b<sub>NIC</sub> z03g z02d Port z03h Port z02e z03j z06b z06a// Switch Switch z07a z07b Host Port z01d Port z02f z03l Host Port z01e<sub>NIC</sub> z03m z05a z06d z02g Port z03n z05b

Figure 19 – Possible Link Configurations

fir

Figure 20 – Example Paths

Host		z01a						z01b		z01c		z01d		z01e	
	Port	z03a	z03b	z03c	z03d	z03e	z03f	z03g	z03h	z03i	z03j	z03k	z031	z03m	z03n
z01a	z03a	Lb						z04a							
	z03b		Lb						z04b				•		
	z03c			Lb	z06a;								·	z06a;	z06a;
					z07a;									z07a;	z07a;
					z07b;									z06c	z07b;
					z06b										z06d
	z03d			z06b;	Lb									z06b;	z06b;
				z07b;								l t		z07b;	z07b;
				z07a;										z07a;	z06d
				z06a										z06c	
	z03e					Lb				z05a		z05a			
	z03f						Lb				z05b		z05b		
z01b	z03g	z04a						Lb							
	z03h		z04b						Lb						
z01c	z03i					z05a				Lb					
	z03j						z05b				Lb				
z01d	z03k					z05a						Lb			
	z031						z05b				<u> </u>		Lb		
z01e	z03m			z06c;	z06c;			Ĭ						Lb	z06c;
				z07a;	z07a;										z07a;
				z06a	z07b;					ļ	i			İ	z07b;
	_				z06b							-			z06d
	z03n			z06d;	z06d;									z06d;	Lb
			ļ	z07b;	z07b;				]		1			z07b;	ļ
				z07a;	z06b									z07a;	
<u></u>		<u></u>		z06a	<u> </u>			<u> </u>		<u> </u>			<u> </u>	z06c	<u> </u>